On Development of Measures of Sustainability in Long Term Experiments in Cropping System Research

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Long-term experiments are important in understanding the complex interactions of various factors affecting crop productivity, the sustenance of which is a major component in maintaining food safety by making provision for assured food to the masses. The term sustainability itself is a complex and contested concept. The dual meaning, in the context of the study envisaged under the paper, of this concept implies persistence and the capacity of something to continue for a long time on the one hand and on the other hand it implies the process of not damaging or degrading the natural resources. The unification of the above two concepts will imply the retention of crop production at micro level (viz., a plot) over a long period of time (say about twenty years) and if that can be achieved, the system may be deemed as sustainable (the natural resources including management practices in case of long term experiments). The object of this paper is to evaluate the performance of the different nutrient management practices (developed by taking combinations of organic and inorganic nutrients in different proportions) in long term experimental settings. Assessment in regard to sustainability of the nutrient management practices has been made on the basis of appropriate statistical measures developed for the purpose with respect to a particular crop. This paper also considers the development of statistical measures related to different nutrient management practices as applied in a cropping system structure. So far as the authors are aware, the statistical measures developed in this paper are new and not available in the existing literature.